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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/695,642	10/29/2003	Naoya Sashida	032061	5390
38834	7590	07/11/2005	EXAMINER	
WESTERMAN, HATTORI, DANIELS & ADRIAN, LLP 1250 CONNECTICUT AVENUE, NW SUITE 700 WASHINGTON, DC 20036			PHAM, THANHHA S	
			ART UNIT	PAPER NUMBER
			2813	

DATE MAILED: 07/11/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

# Office Action Summary

Application No.

10/695,642

Applicant(s)

SASHIDA ET AL.

Examiner

Thanhha Pham

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

## Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

- 1) ☒ Responsive to communication(s) filed on 14 April 2005.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

## Disposition of Claims

- 4) ☒ Claim(s) 1-21 is/are pending in the application.
- 4a) Of the above claim(s) 12-14 and 16-21 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-11 is/are rejected.
- 7) ☒ Claim(s) 15 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

## Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

## Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

## Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date 01/05/2004.
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_.

### **DETAILED ACTION**

This Office Action is in response to Applicant Response to Election of Species Requirement dated 04/14/2005.

#### ***Election/Restrictions***

1. Applicant's election of Species A (figs 1A-1R) in the reply filed on 04/14/2005 is acknowledged. Because applicant did not distinctly and specifically point out the supposed errors in the restriction requirement, the election has been treated as an election without traverse (MPEP § 818.03(a)).
2. Applicant's election to claims 1-11 and 15-21 read on species A of figure 1A-1R is acknowledged. However, there is an error to the election since claims 16-21 depend on claim 14 of species D of figures 27A-27I, not species A. Claims 16-21 should be also withdrawn from consideration since they belong to a different species.
3. Accordingly, claims 12-14 and 16-21 are withdrawn from further consideration pursuant to 37 CFR 1.142(b) as being drawn to nonelected species.

#### ***Claim Rejections - 35 USC § 112***

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

**4. Claim 6 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.**

► With respect to claim 6, it is not clear how removal of a moisture can be executed by coating alcohol **on the first conductive film** when a surface of the insulating film is dehydrated after the plasma is irradiated onto the insulating film and **before the self-orientation layer is formed** – notice that **the film conductive film is formed after the self-orientation layer is formed**.

### ***Claim Rejections - 35 USC § 102***

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

**5. Claims 1-2 are 7-11 rejected under 35 U.S.C. 102(b) as being anticipated by Sekiguchi [US 2002/0024142].**

► With respect to claims 1-2 and 7-9, Sekiguchi (figs 5's-6's and text [0001]-[0161]) discloses the claimed manufacturing method of a semiconductor device comprising steps of:

forming an insulating film (501, fig 5A, text [0133]) over a semiconductor substrate (500) [*claim 1*];

exciting a plasma of a gas having a molecular structure in which hydrogen and nitrogen are bonded and irradiating the plasma onto the insulating film wherein the gas is an ammonia gas (text [0158]) *[claims 1 and 2]*;

forming a self-orientation layer made of substance having a self-orientation characteristic (503, copper, fig 5A, text [0133], [0156]-[0157]) on the insulating film, wherein the self-orientation layer is formed of any one of titanium, aluminum, silicon, copper, tantalum, tantalum nitride, iridium, iridium oxide, and platinum, *[claims 1 and 7]*; and

forming a first conductive film (504, copper, fig 5A, text [0135], [0156]-[0157]) made of conductive substance having the self-orientation characteristic on the self-orientation layer, wherein the first conductive film is formed of any one of titanium, aluminum, silicon, copper, tantalum, tantalum nitride, iridium, iridium oxide, and platinum, wherein the first conductive film is formed by any one of a sputter method, a plasma CVD method, an MOCVD method, and a plating method *[claims 1, 8 and 9]*.

► With respect to claims 10-11, Sekiguchi (figs 5B-5C) shows forming a conductive pattern by patterning the first conductive film and the self-orientation layer wherein the conductive pattern is any one of an electrode and a wiring.

### ***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the

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invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

**6. Claims 3-4 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sekiguchi [US 2002/0024142] in view of Abe [US 2002/0013057].**

Sekiguchi substantially discloses the claimed method including after the plasma is irradiated into the insulating film, the self-orientation layer (503, copper) is formed on the insulating film. Sekiguchi does not specifically mention forming said self-orientation layer while maintain a state that the insulating film is put in a vacuum atmosphere wherein a pressure of vacuum atmosphere is set to  $1 \times 10^{-3}$  torr or less. a vacuum atmosphere with the pressure being set to  $1 \times 10^{-3}$  torr or less

However, forming the self-orientation layer in is known in the art. See Abe (text [0019]-[0020]) as an evidence that shows forming the self-orientation layer in the vacuum atmosphere with the pressure being set to  $1 \times 10^{-3}$  torr or less.

Therefore, at the time of invention, it would have been obvious for those skilled in the art to modify process Sekiguchi by forming the self-orientation layer in vacuum atmosphere as being claimed to prevent contamination to the semiconductor device when forming said film.

***Allowable Subject Matter***

7. Claim 15 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

8. The following are statements of reasons for the indication of allowable subject matter: Recorded Prior Art fails to disclose or suggest the combination of the process steps as recited in the base claim 1 including forming a ferroelectric film on the first conductive film; forming a second conductive film on the ferroelectric film; forming a capacitor upper electrode by patterning the second conductive film; patterning the ferroelectric film to leave at least under the capacitor upper electrode; and forming the capacitor lower electrode at least below the capacitor upper electrode by patterning the first conductive film and the self-orientation layer as characteristics in claim 15.

### ***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Thanhha Pham whose telephone number is (571) 272-1696. The examiner can normally be reached on Monday and Thursday 9:00AM - 9:30PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Carl Whitehead can be reached on (571) 272-1702. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should

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you have questions on access to the Private PAIR system, contact the Electronic

Business Center (EBC) at 866-217-9197 (toll-free).

A handwritten signature in black ink, consisting of several loops and a long horizontal stroke extending to the right.

Thanhha Pham  
Patent Examiner  
Patent Examining Group 2800